CLAIMS

What is claimed is.

1. A process of forming a wire bond comprising:

forming a protective structure over a metallization copper pad, wherein the metallization copper pad makes contact with a device, and wherein the protective structure includes a metal first film disposed above and on the metallization copper pad and a metal second film disposed above and on the metal first film; and

at the second metal film, wire bonding the device.

2. The process according to claim 1, further including:

by probing the metal second film, electrically testing the device.

3. The process according to claim 1, before forming a protective structure, further including:

forming a passivation structure that exposes at least a portion of the metallization copper pad.

4. The process according to claim 1, wherein the metallization copper pad is a metal-six copper (M6 Cu) pad.

5. The process according to claim 1, wherein forming a passivation structure includes:

forming a first passivation layer over the metallization copper pad;

forming a second passivation layer over the metallization copper pad; and

patterning the first and second passivation layers to expose at least a portion of the metallization copper pad.

6. The process according to claim 1, wherein forming a protective structure includes:

forming the metal first film by a process selected from PVD, CVD, electroplating, and electroless plating; and

forming the metal second film by a process selected from PVD, CVD, electroplating, and electroless plating.

7. The process according to claim 6, wherein forming the metal first film results in a film selected from Ni, Pd, Pt, Co, Rh, Ir, Sc, Yt, La, Ce, Re, Ir, Cu, Au, Ag, Cr, Mo, W, Mn, Tc, Ti, TiW, Zr, Hr, NiB, NiP, NiBP, NiCrB, NiCrP, NiCrBP, NiMoB, NiMoP, NiMoBP, NiWB, NiWP, NiWBP, NiMnB, NiMnP, NiMnBP, NiTcB, NiTcP, NiTcBP, NiReB, NiReP, NiReBP, NiCoB, NiCoP, NiCoBP, NiCoCrB, NiCoCrP, NiCoCrBP, NiCoMoB, NiCoMoP, NiCoMoBP, NiCoWB, NiCoWP, NiCoWBP, NiCoMnB, NiCoMnP, NiCoMnBP, NiCoTcB, NiCoTcP, NiCoTcBP, NiCoReB, NiCoReP, NiCoReBP, CoB, CoP, CoBP, CoCrB, CoCrP, CoCrBP, CoMoB, CoMoP, CoMoBP, CoWB, CoWP, CoWBP, CoMnB, CoMnP, CoMnBP, CoTcB, CoTcP, CoTcBP, CoReB, CoReP, and CoReBP, CoNiB, CoNiP, CoPdBP, CoPdCrB, CoPdCrP, CoPdCrBP, CoPdMoB, CoPdMoP, CoPdMoBP, CoPdWB, CoPdWP, CoPdWBP, CoPdMnB, CoPdMnP, CoPdMnBP, CoPdTcB, CoPdTcP, CoPdTcBP, CoPdReB, CoPdReP, CoPdReBP, CuB, CuP, CuBP, CuCrB, CuCrP, CuCrBP, CuMoB, CuMoP, CuMoBP, CuWB, CuWP,

CuWBP, CuMnB, CuMnP, CuMnBP, CuTcB, CuTcP, CuTcBP, CuReB, CuReP, CuReBP; CuNiB, CuNiP, CuNiBP, CuNiCrB, CuNiCrP, CuNiCrBP, CuNiMoB, CuNiMoP, CuNiMoBP, CuNiWB, CuNiWP, CuNiWBP, CuNiMnB, CuNiMnP, CuNiMnBP, CuNiTcB, CuNiTcP, CuNiTcBP, CuNiReB, CuNiReP, CuNiReBP and combinations thereof.

8. The process according to claim 6, wherein forming the metal second film results in a film selected from gold, doré, platinum, and aluminum.

9. The process according to claim 1, wherein metal first film is electrolessly plated with a composition including:

from zero to at least one primary metal selected from cobalt, rhenium, iridium, nickel, palladium, platinum, titanium, zirconium, hafnium, copper, silver, gold, and combinations thereof;

from zero to at least one secondary metal selected from chromium, molybdenum, tungsten, manganese, technetium, rhenium, and combinations thereof;

from zero to at least one primary reducing agent in a concentration range from about 1 gram/liter to about 30 gram/liter;

from zero to at least one secondary reducing agent in a concentration range from about 0 gram/liter to about 2 gram/liter;

a complexing and buffering agent; and

at least one pH adjusting agent.

10. The process according to claim 1, after wire bonding the device, further including:

removing the wire bonding; and

replacement wire bonding the device.

claims 11-17 belong to class 257 S.T.

11. A wire-bond configuration comprising:

a metallization copper pad disposed over a device;

a protective structure disposed above an on the metallization copper pad, wherein the protective structure includes a metal first film disposed above and on the metallization copper pad and a second metal film disposed above and on the metal first film, and wherein the metal first film has at least one of a hardness or a corrosion potential that is greater than at least one of the hardness or corrosion potential of the second metal film; and

at least one of a test probe tip and a bond wire in contact with the protective structure.

12. The wire-bond configuration according to claim 11, further including:

a passivation structure that exposes the metallization copper pad, wherein the passivation structure includes an inorganic first layer disposed on the metallization copper pad and an organic second layer disposed on the inorganic first layer.

13. The wire-bond configuration according to claim 11, wherein the passivation structure includes:

a nitride first layer disposed above and on the metallization copper pad; and

a polyimide second layer disposed above an on the nitride first layer.

14. The wire-bond configuration according to claim 11, wherein the protective structure includes:

a metal first film including at least one primary metal selected from Ni, Pd, Pt, Co, Rh, Ir, Sc, Yt, La, Ce, Re, Ir, Cu, Au, Ag, Cr, Mo, W, Mn, Tc, Ti, Zr, Hf, and combinations thereof; and

a metal second film selected from Au, doré, Pt, and Al.

15. The wire-bond configuration according to claim 14, wherein the metal first film is Ni has a hardness that is greater than the hardness of the metal second film.

16. The wire-bond configuration according to claim 14, wherein the metal second film is Au has a resistance to corrosion that is greater than the resistance to corrosion of the metal first film.

17. The wire-bond configuration according to claim 14, wherein the metal first film is Ni has a hardness that is greater than the hardness of the metal second film, and wherein the metal second film has a resistance to corrosion that is greater than the resistance to corrosion of the metal second film.

18. A method of testing a device, comprising:

contacting a test probe tip to a metallization, wherein the metallization has a structure including a metal first film disposed above and on the metallization, and a metal second film disposed above and on the metal first film, wherein the metal first film has at least one of a hardness or a corrosion potential that is greater than at least one of the hardness or corrosion potential of the metal second film; and

passing a test current through the test probe, wherein the test current experiences an ohmic resistance in a range from about 0.5 Ω to about 4 Ω.

19. The method according to claim 18, wherein the metal first film includes Ni and the metal second film includes Au, or the metal first film includes Ti and the metal second film includes Al.

20. The method according to claim 18, wherein the ohmic resistance is in a range from about 1 Ω to about 3 Ω.

21. The method according to claim 18, wherein the test probe tip penetrates the metal second film and stops before penetrating the metal first film.

22. The method according to claim 18, following passing a test current, further including:

first bonding a first bond wire to the metal second film.

23. The method according to claim 18, following passing a test current, further including:

first bonding a first bond wire to the metal second film;

removing the first bond wire; and

second bonding a second bond wire to the metal second film.